Landsat 7 Processing System (LPS) Transition Plan

November 1998

Revision 2

GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND

Landsat 7 Processing System (LPS) Transition Plan Revision 2

November 1998

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List of TBDs/TBRs

None~~Appendix A. LPS string 5 does not have Oracle Developer 2000 and Programmer 2000 installed on it. The annual maintenance cost is TBD.~~

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CHANGE STATUS LOG			
DOCUMENT NO. **514-2TP/0196** **TITLE** *Landsat 7 Processing System (LPS) Transition Plan*			
CHANGE	DATE	AFFECTED PAGES	REMARKS
Draft	**9 Apr 1996**	**All**	**Draft**
Review	**12 Jul 1996**	**All**	**Revised per comments from the EDC**
Signature	**7 Oct 1996**	**All**	**Revised per comments from GSFC and the EDC**
Revision 1	**18 June 1997**	**Sections 1.6, 1.8, 3.3.11, 3.3.12, 2.2, Figure 3-1, Figure 3-2, Appendix A**	**Revised per comments received from EDC and CCR 970160**
Revision 2	**November 1998**	**All**	**Revised per comments received from EDC and CCR 980259**

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Abstract

This *Landsat 7 Processing System (LPS) Transition Plan* describes the requirements for phasing LPS implementation activities from development into operations and maintenance (O&M). In this respect, this plan defines the responsibilities of LPS Project personnel and their activities required to successfully transition the LPS to Landsat 7 mission operations at the EROS Data Center (EDC). This transition plan also describes the responsibilities of EDC personnel and their activities to support and/or perform LPS transition activities as assigned in this plan.

This plan provides a joint understanding of LPS transition planning, preparation, conduct, and close-out as envisioned by the Landsat 7 and LPS Projects. This plan has been reviewed by and negotiated with the EDC O&M organization and updated accordingly to reflect the agreements reached during the review meetings. It was ~~will be~~ updated and baselined approximately 30 days before the delivery of LPS Release 1 to the EDC.

Keywords: Landsat 7 Processing System (LPS), EROS Data Center (EDC), transition plan

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Preface

This transition plan outlines and describes Landsat 7 Processing System (LPS) transition activities, responsibilities, and products and provides a schedule for accomplishing all three.

This transition plan is controlled by the LPS Project and may be updated by document change notice (DCN) and/or revision procedures in effect on the LPS Project. Comments and questions regarding this plan should be directed to

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Section 1—Introduction

1.1 Purpose

This document defines the transition activities, responsibilities, and products required to turn over the Landsat 7 Processing System (LPS) from the Landsat 7/LPS Project at the National Aeronautics and Space Administration's (NASA) Goddard Space Flight Center (GSFC) to the Landsat 7 operations and maintenance (O&M) organization at the Earth Resources Observation System (EROS) Data Center (EDC). This document also defines specific responsibilities of LPS Project and EDC O&M personnel for performing and/or supporting LPS transition activities.

1.2 Scope

This document is limited to the identification of the roles, responsibilities, schedules, expectations, and assumptions between NASA and EDC necessary to transition the LPS from its development environment at NASA in Greenbelt, Maryland, to the Landsat 7 mission operations environment at the EDC in Sioux Falls, South Dakota.

1.3 Landsat 7 Processing System

The LPS primarily consists of five hardware strings with external and internal connections. Four ~~of~~ strings are required to support the Landsat 7 data capture and Level 0R processing operations. The fifth string is used as a backup to support Landsat 7 mission operations during LPS contingencies. When not being used as a backup, the fifth string can be used to support LPS development, test, and maintenance activities.

The software component of the LPS consists of seven subsystems (major functions):

1. Raw Data Capture Subsystem (RDCS)
2. Raw Data Processing Subsystem (RDPS)
3. Major Frame Processing Subsystem (MFPS)
4. Payload Correction Data (PCD) Processing Subsystem (PCDS)
5. Image Data Processing Subsystem (IDPS)

6. LPS Data Transfer Subsystem (LDTS)
7. Management and Control Subsystem (MACS)

Each LPS hardware string is configured with all LPS subsystems. Each LPS string can be setup to receive and process either the Enhanced Thematic Mapper Plus (ETM+) Format 1 or Format 2 data. Details on configuring LPS strings and performing LPS functions are contained in the LPS User's Guide and the LPS Operations and Maintenance Manual. Detailed information on LPS design are contained in the LPS System Design Specification and the LPS As-Built ~~Detailed Design~~ Specification. All of these documents are listed in Section 2.2

1.4 EROS Data Center

The EDC is a U.S. Geological Survey (USGS) National Mapping Division data management, systems development, and research field center located near Sioux Falls, South Dakota. It was established in the early 1970s to receive, process, and distribute data from NASA Land Satellites. The EDC currently holds the world's largest collection of space- and aircraft-acquired imagery of the Earth.

The EDC will be the primary site for receiving real-time and recorded ETM+ imagery from Landsat 7. The following Landsat 7 ground system elements and other support systems will be installed at the EDC:

- LPS
- Landsat Ground Station (LGS)
- Image Assessment System (IAS)
- Level 1 Product Generation System (LPGS)
- Level 1 Product Distribution System (LPDS)
- EDC Distributed Active Archive Center (DAAC)

The USGS at the EDC will be responsible for the operation and maintenance (O&M) of the LPS during the on-orbit mission operations phase of the Landsat 7 mission.

1.5 LPS Transition Objectives

The objectives of LPS transition activities are to

- Ensure a smooth phaseover of responsibilities from the LPS Project (Development) to the EDC O&M organization through coordinated transition activities.
- Deliver a well-tested and acceptable system (LPS) into the Landsat 7 ground segment configuration and mission operations environment.
- Ensure successful O&M of LPS by well-trained EDC O&M personnel after completion of LPS transition.
- Deliver a complete set of as-built LPS documents and configuration and maintenance records to the EDC to ensure successful O&M of the LPS during Landsat 7 mission operations.

The features of the LPS transition approach includes

- Incorporation of LPS transition activities in parallel with LPS development and implementation at EDC
- Thorough transition planning to meet EDC's expectations for supporting LPS operational readiness, Landsat 7 Project's requirements for mission readiness tests (MRTs), and LPS Project schedules
- Monitoring progress and status of LPS transition activities to ensure they are complete, accurate, and on schedule

The LPS transition activities will be coordinated by the LPS Project (the development organization at GSFC) with the Landsat 7 O&M organization at the EDC and other Landsat 7 Projects (e.g., LGS), as necessary.

The following definitions apply:

- LPS products include items such as documents, hardware, and software programs.
- LPS activities include installation, training, O&M support, etc.

1.6 LPS Implementation Overview

The LPS will be implemented in two incremental releases: Release 1 and Release 2 for the delivery of the baseline system capabilities as specified in the LPS Functional and Performance Specification (F&PS) (see Section 2.2) and associated interface control documents (ICDs). One or more maintenance releases will follow Release 2 to make corrections as required to support Landsat 7 MRTs and operational readiness tests (ORTs). The objectives of the LPS releases are follows:

- LPS Release 1 will support LPS interface testing with the LGS, IAS, and Earth Sciences Data and Information System (ESDIS) EDC DAAC, as available
- LPS Release 2 will meet all LPS functional and performance requirements as described in the baselined LPS F&PS.
- LPS maintenance releases will provide corrections and enhancements, as required, to support the Landsat 7 system integration tests (SITs), MRTs, and ORTs.

LPS Release 1, when complete, will be installed on one of the LPS strings for remote access and review by EDC O&M personnel. Pertinent information regarding remote access and review of LPS Release 1 will be provided by the LPS Project via an E-mail message.

The LPS Project will demonstrate each LPS release at its completion. EDC O&M personnel are invited to attend these demonstrations at NASA/GSFC. After completion of a Landsat 7 Project review of the LPS Release 2 capabilities, the LPS Project will submit LPS Release 2 to EDC personnel to conduct a factory acceptance test (FAT*) at GSFC. On successful completion of the FAT, as concurred and/or verified by EDC personnel at the consent-to-ship review (CSR), the LPS Project will ship the as-tested LPS to the EDC. All five LPS hardware strings and Release 2 software will be shipped to the EDC.

The LPS Project will install and check out the LPS in concert with EDC O&M personnel after its arrival at the EDC. EDC O&M personnel will then perform a site acceptance test (SAT) of the LPS. LPS external interface tests with other Landsat 7 systems (i.e., LGS, IAS, and EDC DAAC) can be conducted during the SAT and/or during the SIT and MRT, as appropriate.

1.7 LPS Transition Overview

The following overview of the transition of the LPS to the EDC briefly annotates the three LPS transition phases and what is expected to occur during each phase.

LPS Transition Planning begins at LPS critical design review (CDR) and ends at LPS Release 1 software delivery. The LPS Project and the EDC will complete all transition planning activities required in the areas of training, facility and installation preparation, and acceptance testing during this phase. The EDC O&M organization may initiate third-party or vendor training for its staff as necessary.

* Subsequent to the completion of this document it has been decided that EDC Factory Acceptance Testing is to be conducted in unison to the LPS System test effort.

LPS Transition begins with the completion of LPS transition planning phase and ends October 1, 1998~~at operational readiness review (ORR[1])~~. The LPS Project will complete course development and training on the LPS system. EDC O&M personnel assume responsibility for LPS operations, system administration, and the LPS commercial off-the-shelf (COTS) hardware and software. The LPS Project provides LPS software source code, at the completion of any releases in progress on October 1, 1998,~~ ORR,~~ to the EDC for developing and delivering a maintenance and/or operations release after the Landsat 7 launch.

Transition Close-out begins with the successful completion of the LPS transition phase at October 1, 1998~~ORR~~ and ends at launch +60~~90~~ days after a final acceptance review (FAR). The LPS Project turns over all LPS records and configuration control responsibility for the LPS application software before the close-out. The LPS Project continues to review and support maintenance activities performed by EDC O&M personnel until launch +60~~90~~ days. Afterward, EDC personnel assume full responsibility for operating, maintaining, and managing the LPS configuration.

1.8 Assumptions

The LPS transition plan is based on the following assumptions:

1. The EDC will arrange vendor training courses identified in this plan for EDC O&M personnel.
2. All LPS problems noted through transition ~~close-out~~ will be logged using the configuration change request (CCR) tracking procedure maintained by the LPS Project on the Interactive CCR Automation System (ICAS) tool. During transition close-out there will be a transition to the EDC Problem Tracking System (PTS) at an agreed upon time.
3. The LPS Project Configuration Management Board (PCMB) will be responsible for assigning, prioritizing, and approving the resolution of all CCRs until the LPS-to-EDC software turnover at the completion of any releases in progress on October 1, 1998. The EDC will arrange with the LPS Project to attend PCMB meetings.
4. The LPS Project will provide ICAS remote access privileges to the EDC O&M organization for creating and monitoring CCRs. EDC will provide the same access to the PTS once transition to it has begun.

[1] October 1, 1998 was the original date for completion of transition at L+90 days. This date was no longer to be tied to launch and a hard date was established.

5. The EDC becomes responsible for controlling changes to LPS COTS hardware and software configurations after the LPS SAT. The LPS Project shall retain configuration management (CM) responsibilities for all LPS-developed software until the an ~~LPS-to-~~EDC led software turnover or~~at~~ launch +60 days, whichever is first.

6. The EDC assumes maintenance support for all LPS hardware, software, and firmware items after the LPS SAT. It is assumed that the EDC Project will organize a Configuration Control Board (CCB) and the LPS Project will have representation on the board.

7. The Landsat 7 Project is responsible for planning, designing, scheduling, and conducting all SITs and MRTs.

8. EDC O&M personnel are responsible for supporting and/or conducting SITs and MRTs after LPS site acceptance testing at EDC.

9. With support from the Landsat 7 Project, the EDC conducts ORTs and operational readiness simulations that culminate in an ORR conducted jointly by the Landsat 7 Project and the EDC.

10. The LPS Project will establish primary points of contact to investigate and resolve trouble calls from the EDC through launch +60~~90~~ days.

11. EDC O&M personnel will allow sufficient privileges to LPS Project personnel to continue performing LPS software maintenance activities via remote access up until~~through~~ launch~~ +90 days.~~.

12. After LPS SAT, EDC O&M personnel will normally assign the LPS fifth string to LPS Project personnel for developing, maintaining, and testing LPS software. It is understood that during LPS contingencies, EDC operations may preempt the LPS fifth string from LPS Project personnel to recover from LPS failures to support SITs and MRTs planned by the Landsat 7 Project and EDC personnel training.

13. The LPS Project will retain CM control over LPS operational software beyond LPS site acceptance testing. The LPS Project will maintain CM control over LPS software through maintenance release(s), developed and delivered by the LPS Project, and at least one operations and/or maintenance release to be developed and delivered by the EDC. ~~after ORR. See assumption 16 below.~~

14. The LPS Project will provide LPS software source code to the EDC ~~at ORR~~ after completion of releases in progress on October 1, 1998. EDC will maintain ~~the Landsat 7 ground~~

~~system's SITs and MRTs.~~ control of development software libraries.

15. With support from the LPS Project, the EDC will develop and deliver a maintenance and/or operational release after the Landsat 7 launch, but prior to the FAR. The intent of this release is to allow EDC O&M personnel to successfully develop, test, and deliver an LPS software release while LPS Project personnel are available for consultation.

16. The LPS Project will turn over LPS operational software CM control responsibilities to the EDC at the completion of the above mentioned delivery~~launch +60 days.~~ or launch +60 days, whichever is first.

17. EDC O&M personnel will conduct the Final Acceptance Review (FAR) of the LPS before launch +60~~90~~ days.

18. The LPS will deliver the LPS design in a CADRE teamwork Model to EDC on 8mm tape. The version of teamwork that the LPS uses is Teamwork 6.1.

19. After delivery of releases in progress on October 1, 1998, the LPS will provide approximately seven full time equivalents (FTEs) worth of maintenance support, additional training, and troubleshooting of the LPS as a result of receipt of "live" spacecraft/instrumental data.

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Section 2—Applicable Documents

The following documents contain applicable and reference information regarding the LPS, the Landsat 7 system, and the LPS transition plan. If there are conflicts between the listed document and the requirements of this plan, this transition plan takes precedence.

2.1 Applicable Documents

1. NASA/GSFC/MO&DSD, Landsat 7 Processing System Project Management Plan (PMP), Revision 1, May 1995

2. —, *Landsat 7 Processing Build Implementation Plan (BIP)*, 514-4BIP/0195 [use approved baseline plan]

3. —, *Landsat 7 Processing System Integration and Test (I&T)*, 514-2ITP/0195, August 31, 1995

4. —, Code 500, *Landsat 7 Ground System Master Mission Schedule* [use approved baseline schedules]

5. EDC, *EDC Site Preparation Plan for the Landsat 7 LGS, LPS, and IAS* [use approved baseline plan]

6. —, *Landsat 7 Processing System Acceptance Test Criteria*, Review, July 1996

2.2 Reference Documents

1. NASA/GSFC/MO&DSD, *Landsat 7 Processing System (LPS) Functional and Performance Specification (F&PS)*, Revision 2~~1~~, 560-8FPS/0194, January 20, 1998~~July 28, 1995~~

2. —, *Landsat 7 Processing System (LPS) Operations Concept*, Revision 3~~1~~, 560-3OCD/0194, September 22, 1997~~August 25, 1995~~

3. —, *Landsat 7 Processing System (LPS) System Design Specification*, 560-8SDS/0194, May 26, 1995

4. —, *Landsat 7 Processing System (LPS) Detailed Design Specification*, 514-4DDS/0195, November 1995

5. —, *Landsat 7 Processing System (LPS) Users Guide*, 514-3SUG/0195

6.—, *Landsat 7 Processing System (LPS) Operations and Maintenance Manual*, 514-3OCD/0196

7.NASA/GSFC, *Landsat 7 Detailed Mission Requirements*, May 15, 1995

8. MO&DSD, *Mission Operations Concept Document for the Landsat 7 Ground System*, June 5, 1995

9.NASA/GSFC/MO&DSD, *Landsat 7 Ground System Performance Verification Plan (PVP)*, November 1995

10. —, *Landsat 7 Ground System (GS) Integration and Test Plan (I&TP)*, 510-2ITP/0395, October 1995

11. —, *Systems Management Policy*, MDOD-8YMP/0485, July 1986

12. —, *Landsat 7 Processing System (LPS) As-Built Specification (ABS)*, 514-4DDS-0195, November ~~August~~ 1997

Section 3—LPS Transition Phases and Activities

3.1 LPS Transition Phases

This section defines LPS transition phases and their activities. The LPS transition to operations takes place incrementally in parallel with LPS development and delivery of releases. The LPS Build Implementation Plan (BIP) (see Section 2.1) defines the individual capabilities of each LPS planned release. The schedule and scope of the LPS maintenance releases will be planned as needed, given upcoming tests and CCRs. Figure 3–1 shows a timeline of LPS transition phases and activities based on the LPS implementation plan and derived from *Landsat 7 Ground System Master Mission Schedule* (see Section 2.1.4). The LPS transition activities are divided into three phases:

1. LPS transition planning
2. LPS transition
3. Transition close-out

The following three subsections provide an overview of the activities performed during each LPS transition phase. Details on LPS transition activities are provided in subsequent sections. Figure 3–2 provides a matrix of responsibilities that are transferred from the LPS Project to the EDC O&M organization at various LPS transition milestones.

3.1.1 LPS Transition Planning Phase

This phase encompasses LPS development and system test activities, begins after LPS CDR, and culminates with the delivery of LPS Release 1. All LPS transition planning activities are expected to be complete during this phase. The LPS Transition Plan, Installation Plan, and O&M Manual are to be completed by the LPS Project during this phase. LPS training activities begin near the end of this phase. The LPS Acceptance Test Criteria; EDC Site Preparation Plan for the Landsat 7 LGS, LPS, and IAS; and EDC Landsat 7 Data Handling Facility Operations Support Plan are available from the EDC during this phase. Also, a Mission Readiness Test Plan and Procedures will be produced by the Landsat 7 Project. All of these documents are listed in Section 2.1

Figure 3–1. LPS Transition Schedule (1 of 3)

Figure 3–1. LPS Transition Schedule (2 of 3)

Figure 3–1. LPS Transition Schedule (3 of 3)

~~Figure 3–1. LPS Transition Schedule~~

Figure 3–2. LPS Transition Responsibilities

3.1.2 LPS Transition Phase

This phase begins at the completion of the LPS transition planning phase (close to the delivery of LPS Release 1) and ends ~~at~~ October 1, 1998~~Landsat 7 Ground System ORR~~. This is the primary transition activities phase during which LPS system responsibilities are gradually turned over from the LPS Project (the LPS development organization) to the EDC (the EDC O&M organization). Several LPS transition activities, including LPS training, factory acceptance testing, installation at the EDC, site acceptance testing, interface testing with other Landsat 7 systems, integration into Landsat 7 mission operations, and transfer of LPS system administration and CM responsibilities, for LPS COTS hardware only, are completed during this phase. The LPS software source code, users guide, as-built design specification, programmer's reference manual, and maintenance release(s) also are delivered to the EDC. The LPS standard operating procedures (SOPs) and maintenance procedures are completed by the EDC.

3.1.3 Transition Close-out Phase

This phase begins October 1, 1998~~at ORR~~ and ends on day 60~~90~~ after the Landsat 7 launch (i.e., launch +60~~90~~ days). EDC O&M personnel become responsible for all LPS activities, except LPS operational software CM, at the start of this phase. The LPS software CM responsibility is turned over to the EDC by~~at~~ launch +60~~ days near the end of this phase~~. The LPS Project switches to a support role to advise EDC personnel in performing LPS O&M activities. EDC O&M personnel plan and prepare all pre-launch and post-launch releases, as deemed necessary, for LPS operations. LPS Project personnel are available to assist EDC O&M personnel in preparing the operational releases and in testing them, if requested by the EDC, before delivery to EDC operations.

The LPS Project completes the LPS-to-EDC handover by providing all LPS documents to the EDC O&M organization during this phase. The EDC O&M organization holds the LPS FAR before launch +60~~90~~ days. The EDC O&M organization becomes solely responsible for the LPS at the end of this phase.

3.2 Transition Planning Activities

The following activities are performed during transition planning:

- Training planning and course development
- Facility planning and preparation
- Installation planning and preparation
- Acceptance test planning

The following sections provide additional details on LPS transition planning activities.

3.2.1 Training Planning and Preparation

In consultation with EDC O&M personnel, the LPS Project will develop a set of LPS training courses and a schedule to train EDC personnel in the O&M of the LPS. These courses will be categorized into two groups:

1. Vendor training courses available on LPS COTS hardware and software
2. GSFC-prepared courses on LPS-developed hardware and software items

It is expected that EDC O&M personnel will complete all arrangements for taking the COTS hardware and software vendor training courses during the LPS transition phase. Depending on vendor training schedules, some training could also begin in the LPS transition planning phase. The LPS Project recommends that EDC personnel should complete all recommended vendor and COTS training courses during the early part of the LPS transition phase to prepare themselves for taking detailed LPS training courses (developed hardware and software) during the later part of the LPS transition phase. The EDC O&M organization is responsible for arranging LPS Project-recommended vendor training courses directly with the LPS COTS hardware and software vendors.

3.2.1.1 Vendor Training Courses

The LPS Project recommends that EDC O&M personnel to take the following vendor training courses to support LPS transition activities:

- SGI Challenge XL System Administration
- SGI Challenge XL Advanced System Administration

- SGI Challenge XL Network Administration
- SGI Onyx Maintenance
- SGI Introduction to IRIX
- ORACLE Relational Database Administration I (DBA I)
- ORACLE Relational Database Administration II (DBA II)
- ORACLE Relational Database Application Development
- ORACLE Relational Database Tuning and Troubleshooting

The primary objective of EDC personnel in taking these courses is to learn the functional and performance capabilities and operational features of the various COTS hardware and software items used in LPS implementation. It is possible that some EDC personnel are already trained in the use of the LPS COTS item and products.

3.2.1.2 LPS Operations Training Courses

The LPS Project will prepare and conduct the following courses on LPS operations:

- LPS System Overview
- LPS Hardware Familiarization (Basic operation)
- LPS System Operations Courses:
  - LPS Management and Control
  - Landsat 7 Data Capture Operations
  - Level 0R Processing Operations
  - Level 0R Data Transfer Operations
  - Level 0R Reprocessing Operations
  - LPS Contingency Operations (e.g., string switchover)
  - Moving Window Display Operations
  - Manual Operations*
  - LPS String/System Readiness Tests

*Note: The LPS Project will provide recommended guidelines for LPS manual operations. The EDC O&M organization is responsible for developing and establishing SOPs for the LPS. The LPS Project will provide review and consulting support to EDC O&M personnel in completing the SOPs during the transition phase.

The main objective of LPS operations training is to guide EDC personnel through the detailed steps required to capture, process, and deliver Level 0R data to the EDC DAAC for a contact period received at the EDC. LPS system initialization parameters, error reporting thresholds, and error messages will be covered for each step of LPS operations. The LPS nominal and contingency operations also will be covered in these courses.

The LPS Project will use a mix of classroom and computer room training sessions to teach these courses. It is expected that all LPS classroom training sessions in LPS operations will be complete before the start of LPS factory acceptance testing. The LPS Project will hold informal training sessions to provide hands-on experience to EDC personnel. Early hands-on opportunities to review and exercise limited LPS operation skills will be available after implementation of LPS Release 1. After LPS FAT, LPS Release 2 will also be available to EDC personnel to exercise limited LPS operations and to prepare for LPS site acceptance testing. Figure 3–1 provides a schedule of classes.

The LPS Project will use LPS users guide, O&M manuals, and LPS system and as-built design documents, as appropriate, to prepare the presentation material required for LPS operations training courses. The LPS Project will not develop and deliver any specially designed or tailored training manuals to be used as additional references during and/or after completion of the training courses.

It is expected that all LPS operations courses, excluding hands-on exercises, can be completed in two 6-hour sessions.

3.2.1.3 LPS Maintenance Training Course

The LPS Project will prepare and conduct the following courses on LPS maintenance:

- LPS Hardware Maintenance Course (as-built design)
  - LPS Hardware Overview and Components
  - Ciprico Disk Care and Management
  - High Speed Parallel Digital Interface (HPDI) Overview and Device Driver
- LPS Software Training Courses (as-built design)
  - MACS
  - LPS Database
  - RDCS
  - RDPS

  - MFPS
  - PCDS
  - IDPS
  - LDTS
  - LPS Software Maintenance (guidelines and tools)**
- LPS Configuration Management Guidelines**

**Note: The LPS Project will provide recommended guidelines for performing LPS maintenance and CM activities. The EDC maintenance organization will be responsible for developing and establishing the formal maintenance procedures for LPS. The LPS Project will provide review and consulting support to EDC personnel in developing these procedures during the LPS transition phase.

The main objective of LPS maintenance training is to enhance the understanding of EDC personnel in the design and construction of the LPS system and hardware and software subsystems for effectively testing and verifying their readiness to support LPS operations. LPS Project personnel directly responsible for an LPS hardware or software subsystem will teach these courses. They will conduct one-on-one walkthroughs with their respective EDC counterparts to thoroughly discuss the design of each subsystem. LPS Project personnel also will identify and/or describe the various test tools and test data sets that could help EDC personnel in diagnosing and isolating a limited set of problems. The LPS Project will informally deliver these tools (engineering code) and test data sets, developed during LPS implementation, using an unconfigured and/or unbaselined library.

The LPS Project will use a mix of classroom and online training sessions to review and discuss the design and structure of LPS hardware and software subsystems and components. LPS instructors will develop, discuss, and simulate a limited set of test cases to provide EDC personnel with some actual experience in diagnosing and correcting LPS system, hardware, and software problems. The LPS Project believes that early involvement of EDC personnel in LPS routine maintenance activities (as shown in the LPS transition schedule in Figure 3–1) is the key to developing LPS maintenance skills. LPS maintenance training sessions will be held after LPS SAT and completion of the LPS operations courses. The LPS software source code will be delivered to the EDC ~~at ORR~~ after completion of LPS releases in progress on October 1, 1998, maintenance training, SITs, and MRTs. All LPS test tools, engineering code, and test data, as available and configured, will be delivered informally to the EDC.

The LPS Project will use LPS O&M manuals, the LPS system, and as-built design documents and the programmers reference guide to prepare all presentation material required for LPS maintenance training courses. The LPS Project will not develop and deliver any specially designed or tailored training manuals to be used as additional references during and/or after completion of the training courses.

If desired by the EDC, EDC personnel will be responsible for arranging and video taping the LPS training courses. It is expected that all LPS maintenance courses, excluding hands-on exercises, can be completed in four 6-hour sessions.

3.2.2 Facility Planning and Preparation

The EDC is responsible for planning the LPS area at the EDC. The EDC Site Preparation Plan, prepared by the EDC, will contain details on the LPS facility design; the LPS equipment layout in the Landsat 7 mission operations area; power, grounding, and cooling arrangements; and a schedule for preparing the facility for LPS installation. It is expected that the EDC will complete all LPS facility preparations at least 2 weeks before LPS FAT. The EDC will provide the LPS facility readiness status at the LPS CSR, which is held after LPS FAT. This will allow LPS Project to verify and/or update LPS installation drawings and procedures in accordance with the as-built facility and/or facility changes, if any. The LPS facility planning and preparation schedule is shown in Figure 3–1.

3.2.3 Installation Planning and Preparation

The LPS Project is responsible for planning the installation of LPS at the EDC. The LPS Installation Plan outlines the installation activities to be performed by LPS Project personnel for installing all five LPS strings in the Landsat 7 mission operations area at the EDC. The LPS Installation Plan will be designed to meet the physical location, power, grounding, and cabling requirements and constraints specified in *EDC Site Preparation Plan for the Landsat 7 LGS, LPS, and IAS*. All LPS hardware, software, and cables to be installed at the EDC will be identified in the LPS Installation Plan and/or the O&M manual. The LPS Project will ensure that all material and products required for LPS installation are identified and procured during the early part of the LPS transition period. Support and material (e.g., furniture, storage racks) required from the EDC will be identified in this plan. This plan will include equipment checkout procedures (e.g., startup, shutdown, and installation verification checks and tests) to ensure the operational readiness of each LPS string before it is

turned over to the EDC O&M organization. The schedule for LPS installation activities is shown in Figure 3–1.

3.2.4 Acceptance Test Planning

The EDC O&M organization is responsible for planning and conducting the LPS FAT at GSFC and the SAT at the EDC. The LPS Acceptance Plan will outline the EDC's minimum requirements and criteria for accepting the LPS on delivery and installation at the EDC. The EDC O&M organization will review and negotiate LPS acceptance requirements and criteria with the LPS Project during the LPS transition planning phase. It is expected that this plan will be finalized at least 3 months before FAT. The LPS Project will use the results of the LPS FAT, presented and/or discussed at the CSR, in its decision to ship the LPS to the EDC. Similarly, the LPS Project will use the results of the LPS FAT and SAT, performed by the EDC, as the basis for turning over the LPS COTS items administration, operations, and specific maintenance responsibilities to the EDC. The LPS acceptance activities and schedule are shown in Figure 3–1.

3.3 LPS Transition Activities

LPS transition phase activities are as follows:

- Review LPS Release 1
- Complete LPS training
- Conduct FAT
- Deliver and install LPS
- Conduct SAT
- Conduct maintenance release test
- Conduct physical configuration audit (PCA) and functional configuration audit (FCA)
- Conduct MRTs
- Conduct ORTs
- Provide testing support
- Prepare for LPS operations
- Prepare for LPS maintenance
- Perform LPS CM

3.3.1 Review LPS Release 1

LPS Release 1 will be completed during the early part of the LPS transition phase. The LPS Project will keep EDC O&M personnel informed of the status of LPS Release 1 verification test activities. The LPS Project will demonstrate the LPS Release 1 capabilities after successful completion of the verification tests. EDC O&M personnel will be invited to attend this demonstration. Afterward, LPS Release 1 software will be installed on an SGI Challenge L/XL machine at GSFC. The LPS Project will set up login accounts for requested EDC O&M personnel for remote access and evaluation of LPS Release 1 capabilities.

3.3.2 Complete LPS Training

All LPS and vendor training is completed during the LPS transition phase. LPS training requirements and/or recommendations are provided in Section 3.2.1. A high-level schedule for LPS training is shown in Figure 3–1. It is expected that all LPS introductory, vendor, and operations (class sessions only) training will be completed before LPS FAT. LPS hands-on and maintenance training will be provided after LPS installation at the EDC.

The LPS Project will conduct LPS overview and operations training classes once at GSFC for EDC FAT personnel and a second time, if necessary, at the EDC for other EDC O&M personnel after LPS installation. The LPS Release 1 software will be available for review during the LPS transition phase.

3.3.3 Conduct Factory Acceptance Test

After successful system test of LPS Release 2, EDC O&M personnel will begin factory acceptance testing of the LPS. The LPS Project will configure LPS strings for LPS FAT and provide system administration and CM services as required by the EDC FAT team. All FAT procedures will be developed by the EDC O&M organization. The LPS Project will provide review and consulting support to EDC personnel during the preparation of these procedures. If desired and requested by the EDC, the LPS Project will provide EDC-selected test data, test procedures, and test tools that have been developed for LPS Release testing for preparing the LPS FAT procedures.

After completion of the FAT, EDC personnel will review the results with the LPS Project at CSR. The EDC FAT team will also consult the LPS Project in categorizing the problems encountered during the FAT and logging them into the ICAS problem-tracking tool. The LPS

Project or the EDC FAT Team will log these LPS problems using the CCR procedures established on the ICAS. The LPS Project can provide electronic or hardcopies of the LPS FAT problem reports to the EDC. On successful completion of the FAT, the EDC FAT director will provide his/her concurrence at CSR for shipping the LPS to the EDC. The LPS FAT schedule is shown in Figure 3–1.

3.3.4 Deliver and Install LPS

The LPS Project will deliver all five hardware strings and Release 2 software to the EDC after successful completion of the FAT.

EDC O&M personnel are responsible for receiving the LPS at the EDC. The LPS Project will assign personnel to install the LPS as specified in the Landsat 7 EDC Site Preparation Plan and LPS Installation Plan. A 1-week period is allocated for completing this installation. The LPS delivery and installation activity schedule is shown in Figure 3–1.

Following successful installation and checkout, the LPS will be available to support hands-on operations training and to dry run LPS SAT procedures. If necessary, the LPS Project will work out a daily schedule with EDC O&M personnel for sharing the LPS between acceptance test preparation and LPS training activities. It is expected that no more than three 4-hour sessions will be required to complete LPS hands-on operations exercises. As a general rule, LPS SAT preparation activities will have precedence over LPS training for accessing LPS resources.

EDC O&M personnel are responsible for assigning an EDC facility support person to support and coordinate LPS installation activities of LPS Project personnel throughout this activity.

3.3.5 Conduct LPS Site Acceptance Test

EDC O&M personnel will be responsible for conducting an LPS SAT in accordance with the acceptance test plan and procedures reviewed and concurred by the LPS Project. The LPS Project will assign a representative to attend LPS site acceptance testing and witness the results. The EDC acceptance test director may request the LPS Project representative to review test results during the test and to clarify any problems encountered during the acceptance test. The EDC SAT director will conduct an LPS acceptance test briefing at the end of the SAT All problems encountered during the acceptance test will be categorized and logged by the EDC using ICAS procedures. The LPS acceptance criteria, described in the LPS Acceptance Plan, will be used to assess the severity of LPS problems and to decide on the full,

partial, and/or conditional acceptance of the LPS and/or LPS capabilities (such as data capture and Level 0R processing). A schedule for resolving all problems will be negotiated between the LPS Project and the EDC O&M organization after the LPS acceptance test briefing.

At the completion of LPS SAT, the EDC operations organization will assume the system administration responsibility for all LPS COTS hardware and software items. The LPS Project will continue to provide system administration consulting support to EDC until launch +60 days ~~Landsat 7 ORR~~.

3.3.6 Conduct Maintenance Release Test

The LPS Project has tentatively planned ~~an~~ LPS maintenance releases to deliver corrections to problems discovered during the LPS acceptance test. If required, the LPS Project expects to deliver a maintenance release before the start of ORTs and operational readiness simulations. A tentative schedule for the LPS maintenance releases is shown in Figure 3–1. When delivered, the LPS maintenance release will be acceptance tested by the EDC using acceptance procedures baselined at the beginning of the LPS acceptance test. The LPS maintenance release(s) will be used by the EDC to verify that the LPS problems encountered during acceptance testing and assigned to this release are satisfactorily corrected by the LPS Project.

3.3.7 Conduct Physical and Functional Configuration Audits

The LPS Project and the EDC O&M organization will conduct a joint PCA/FCA of the LPS after completion of the acceptance test. The LPS CM representative will be responsible for supporting these audits by the EDC CM representative. The summary results of these audits will be included in the final or formal acceptance records of the LPS. All discrepancies noted during these audits will be logged using the ICAS problem reporting procedures tool.

3.3.8 Conduct Mission Readiness Tests

The Landsat 7 Project plans to conduct a number of SITs and MRTs to ensure the integration of the various software releases, hardware configurations, and operations scenarios into the constructions and evolution of the Landsat 7 ground segment. The Landsat 7 MRT

schedules are documented in *Landsat 7 Ground System Master Mission Schedule*. A tentative schedule for LPS applicable SITs and MRTs is shown in Figure 3–1.

The LPS participation in the Landsat 7 SITs and MRTs will start with the delivery of LPS Release 1 and end with end-to-end testing of the Landsat 7 ground segment. During this period, LPS Release 1 will be integrated with the LGS and tested to receive ETM+ wideband data. After LPS Release 2 is successfully developed, the LPS will be tested for science data processing and data files delivery to the EDC DAAC. The LPS Project will support these tests throughout the LPS-to-EDC transition. The Landsat 7 Project is responsible for scheduling and coordinating these tests with the LPS, EDC, and all other Landsat 7 ground systems.

3.3.9 Conduct Operational Readiness Tests

The Landsat 7 ground segment and the EDC are responsible for preparing for and conducting mission ORTs and operational readiness simulations. The Landsat 7 Project will prepare the mission operations plan and procedures and provide Landsat 7 ground segment operations training, including hands-on training, to EDC personnel. The Landsat 7 Project will conduct operations simulations to help improve the operational skills of EDC personnel, as well as verify operational capabilities of the integrated ground segment. The LPS and ground segment operational readiness preparations and simulations will culminate with an ORR.

The Landsat 7 Project, with support from the LPS Project, will complete ORT procedures during the LPS transition phase. These procedures may selectively include the LPS procedures used in LPS acceptance tests. The Landsat 7 Project and EDC test directors may also enhance and modify LPS acceptance test procedures to adapt them to the ORT environment and simulations. LPS Project personnel will provide consultation support to the Landsat 7 Project and the EDC throughout the ORT and operational readiness simulation activities. A tentative schedule of Landsat 7 readiness activities, based on *Landsat 7 Ground System Master Mission Schedule*, is shown in Figure 3–1.

EDC operations personnel will be responsible for conducting LPS ORT in coordination with other Landsat 7 systems and external interfaces. LPS Project personnel will be on hand to review test results and support analysis of the problems encountered during ORT. All problems encountered during the test will be logged using ICAS problem-reporting procedures. The LPS Project also will assist the EDC in resolving ORT problems, as appropriate.

The LPS Project will assist EDC operations in preparing the LPS for use in the ORT environments. At a minimum, the following activities will be performed:

- Load operational databases and verify contents.
- Establish and verify operational mission interfaces.
- Support end-to-end tests, simulations, and ORT-related tests.

3.3.10 Provide Testing Support

The LPS Project will provide LPS testing support starting at LPS acceptance testing through the end of ORT. This support includes providing reviews of test procedures, LPS preparation for ORT, and review of test results and problems.

3.3.11 Prepare for LPS Operations

The EDC operations organization will prepare an Operations Support Plan and SOPs for normal and contingency LPS operations. The LPS Project will provide consulting support to EDC operations in preparing the Operations Support Plan and SOPs. The EDC operations organization will be responsible for validating and approving all LPS SOPs. A tentative schedule of LPS operations planning activities, based on *Landsat 7 Ground System Master Mission Schedule*, is shown in Figure 3–1.

The LPS Project expects that most EDC operations personnel will have completed introductory courses in LPS system and operations and vendor training courses in COTS hardware and software before LPS factory acceptance. These training courses are expected to assist EDC operations personnel in effectively preparing for the LPS FAT and in reviewing the installation activities at the EDC. With the arrival of the LPS equipment at the EDC, the LPS Project will be in a position to begin meeting with EDC O&M personnel daily to review LPS Project activities. These meetings will serve as a prelude to LPS transition to EDC O&M organizations.

The LPS Project plans to turn over the LPS COTS hardware and software administration responsibilities to EDC operations as soon as possible after completion of all vendor training and the LPS SAT. The LPS Project will continue to provide backup system administration and consulting support, as required, for all LPS COTS hardware and COTS software until launch +60~~90~~ days.

3.3.12 Prepare for LPS Maintenance

EDC O&M personnel are responsible for preparing for LPS hardware and software maintenance to support Landsat 7 mission operations. In accordance with Landsat 7 ground segment guidelines and/or the LPS maintenance philosophy, the EDC maintenance organization will prepare *EDC Landsat 7 Data Handling Facility Operations Support Plan and LPS Standard Operating Procedures.* This document will define how the EDC maintenance organization plans to procure and retain vendor maintenance and software upgrade or licensing agreements, perform in-house maintenance, and stock spares to maintain all LPS COTS and custom hardware and software items throughout the Landsat 7 mission.

The LPS Project expects senior EDC maintenance personnel to be on hand to discuss and begin LPS maintenance transition activities soon after SAT. After completion of the LPS PCA and FCA, the LPS Project will turn over all COTS products maintenance agreements and licensing responsibilities, along with LPS system administration responsibilities, to EDC O&M personnel. The LPS Project will continue to provide backup maintenance and/or consulting support to the EDC on all LPS COTS hardware and software items until launch +60 ~~90~~ days. The LPS Project will turn over the LPS application software to EDC O&M personnel after completion of releases in progress October 1, 1998~~at ORR~~. After ORR, EDC O&M personnel will assume additional responsibilities for LPS software development and maintenance under the guidance of the LPS Project.

The LPS Project will provide consultation support to the EDC maintenance organization in drafting a maintenance plan and the corrective and preventive maintenance procedures for LPS. It is recommended that LPS maintenance procedures be drafted by the EDC after completion of all training in LPS COTS hardware and software. The EDC maintenance organization will be responsible for validating and approving all LPS maintenance procedures. A tentative schedule of Landsat 7 and LPS maintenance preparation activities, based on *Landsat 7 Ground System Master Mission Schedule*, is shown in Figure 3–1.

3.3.13 Perform LPS Configuration Management

The LPS Project will retain CM responsibilities for the operational LPS application software ~~beyond ORR~~ until launch +60 days. This facilitates rapid software patches, if necessary, by the LPS Project while permitting EDC O&M personnel to prepare for an EDC managed

maintenance release~~the~~ software turnover without the stress of making mission-critical software deliveries.

LPS Project will deliver a baseline operational release 4.0.0 and then the known minor release 4.1.0 Both EDC and the LPS Project will use the full PVCS composed of 4.0.0 and 4.1.0 as the basis for further operational patches and minor releases by the LPS Project and an EDC managed maintenance delivery and each site will maintain their own PVCS archive.

If there are further patches needed for the operational release, the LPS Project will maintain CM of that version at GSFC and will make updates in PVCS under the CM of the LPS Project. These updates will be coordinated with EDC so that EDC can incorporate them for inclusion into PVCS at EDC for the EDC maintenance release. The EDC-led maintenance release will make use of PVCS for access to the development software.

At launch +60 days or after an EDC managed maintenance delivery, EDC ~~maintenance~~ becomes fully responsible for LPS software maintenance and CM. ~~The LPS Project will continue to support the EDC, as a backup and in a consulting role, in the maintenance and CM of LPS application software until launch +90 days.~~

3.4 Transition Close-out Activities

The LPS transition close-out activities include

- Attending the Landsat 7 ORR
- Reviewing and supporting LPS release(s) by the EDC
- Delivery of the final LPS Project led maintenance release to resolve problems encountered during receipt of real data and higher priority problem fixes and a subsequent minor release to handle the 0-byte patch and other high priority items
- ~~Reviewing and supporting LPS release(s) by the EDC~~
- Supporting LPS-to-EDC operational software CM turnover
- Attending the LPS FAR

3.4.1 Attend Landsat 7 Operational Readiness Review

The EDC will conduct an ORR after completion of Landsat 7 MRTs and ORTs. The LPS Project will support and participate, as required, in the conduct of this review. It is expected that all problems discovered during MRT and ORT are satisfactorily resolved by ORR. If a problem cannot be solved by ORR and the problem is deemed mission critical, a work-off plan shall be presented at ORR.

3.4.2 Review and Support LPS Release(s) by EDC

The LPS Project will make the LPS software available to the EDC maintenance organization after delivery of above mentioned release~~at ORR~~. EDC O&M personnel will have an opportunity to exercise their LPS maintenance skills~~, learned before ORR,~~ to develop an LPS maintenance or operational release before the Landsat 7 launch. The LPS Project will work with EDC maintenance personnel in the construction of their first release and to ensure that it is successfully delivered to EDC operations. Additional operational releases, if required by LPS operations, will give the EDC maintenance organization sufficient experience and confidence to effectively maintain and manage LPS software, without LPS Project support, after the LPS transition close-out (launch +60 ~~90~~ days).

3.4.3 Support LPS-to-EDC Software CM Turnover

The LPS Project will provide hands-on LPS CM training beginning with the first EDC maintenance release to Landsat 7 operations. The LPS Project will gradually phase the EDC O&M organization into routine LPS CM activities during the course of the close-out period. After completion of hands-on CM training, the LPS Project will turn over LPS CM responsibilities to the EDC organization by~~at~~ launch +60 days.

3.4.4 Attend LPS Final Acceptance Review

The LPS Project will attend an LPS FAR with EDC O&M personnel at least 2 weeks before the LPS close-out to review the status of LPS acceptance and transition activities and to turn over all LPS software and LPS design, development, test, and maintenance records to the EDC. The objective of this meeting would be to make sure that EDC

organizations have access to and understand the issues, if any, associated with each LPS record item or a mission support document. The LPS Project will deliver two sets of electronic copies and two sets of hardcopies for the as-built versions of the following LPS documents and/or records:

- LPS Users Guide
- LPS O&M Manual
- LPS Programmers Reference Guide
- LPS As-Built Specification
- LPS Interface Detailed Description Documents
- LPS Data Format Control Book
- LPS ICDs (LGS and IAS)
- LPS system test results and test data
- LPS diagnostics and checkout scripts (engineering version as appropriate)
- LPS COTS item maintenance and/or licensing agreements (as appropriate)

The LPS Project will ensure that copies of all LPS records and documents are available to the EDC operations and maintenance organizations during the LPS transition phase. Figure 3–1 shows a schedule for completing some of the LPS O&M documents. The LPS Project recommends that the EDC O&M organization provide their comments and corrections, as appropriate, to these documents by ORR. This will enable the LPS Project to deliver the as-built updated LPS documents to EDC by launch +60~~90~~ days.

With the turnover of the LPS records, the EDC maintenance organization will become fully responsible for all LPS maintenance (i.e., hardware, software, and firmware) with cognizant support from the LPS Project. The LPS Project will continue to provide backup or consulting support to the EDC through 60~~90~~ days beyond Landsat 7 launch.

Appendix A: Maintenance Support Costs by Vendor

SILICON GRAPHICS INC.

Description - The SGI support includes full S/W, H/W, Technical support, 5 X 9, for one year. ON-SITE support for H/W. S/W telephone support and updates next nusiness day. SGI support may be contacted at 1-800-800-4744. Note: use serial numbers listed below as maintenance support contract identification numbers.

S/N	MACHINE ID	MAINT ENDS	COST/yr
S39460	CHAL XL (LPS001)	(5/31/99~~98~~)	$24757.20
S46910	CHAL XL (LPS002)	(3/14~~31~~/99~~98~~)	$24757.20
S46911	CHAL XL (LPS003)	(3/14/99~~98~~)	$24757.20
S46908	CHAL XL (LPS004)	(3/14/99~~98~~)	$29936.40
S37891	CHAL XL (LPS005)	(1/14/99~~98~~)	$24757.20
080069089491	L7INDY3	(1/14/99~~98~~)	$819
08006909EEE9	L7INDY8	(3/14/99~~98~~)	$819
0800690A36C8	L7INDY9	(3/14/99~~98~~)	$819
		Total	$132,475.20

Ciprico Inc.
2800 Campus Drive
Plymouth, MN 55441

Description - The Ciprico Safty Net Spares Contract includes on site sparing for all major components, overnight shipment of minor components and technical support 8 AM - 6 PM CT. Ciprico support may be reached at 1-800-727-4669. Note: support is tracked by the serial numbers listed below. The service contract numbers are 961212, 961213, and 961214.

LPS String	S/N	MODEL #	MAINT ENDS	COST/yr
LPS001	001920	AR6712	8/31/99~~9/11/98~~	$640
LPS001	001919	AR6712	8/31/99~~9/11/98~~	$640
LPS002	002664	AR6712	8/31/99~~9/11/98~~	$640
LPS002	002659	AR6712	8/31/99~~9/11/98~~	$640
LPS003	002660	AR6712	8/31/99~~9/11/98~~	$640
LPS003	002663	AR6712	8/31/99~~9/11/98~~	$640

LPS004	002662	AR6712	8/31/99~~9/11/98~~	$640
LPS004	002661	AR6712	8/31/99~~9/11/98~~	$640
LPS005	001915	AR6712	8/31/99~~9/11/98~~	$640
LPS005	001916	AR6712	8/31/99~~9/11/98~~	$640
			Total	$6400

General Standards Corporation
8302A Whitesburg Dr.
Huntsville, Al 35802

Description: Time plus materials is the maintenance support policy for the repair of the HPDI/VSIO cards. Note: 6 spare HPDI/VSIO cards are supplied as part of LPS hardware inventory. General Standards Corp. may be contacted at 205-880-8787.

LPS String	S/N	MODEL #	MAINT ENDS	COST/yr
LPS001		VME-VSIO-1	N/A	
LPS002		VME-VSIO-1	N/A	
LPS003		VME-VSIO-1	N/A	
LPS004		VME-VSIO-1	N/A	
LPS005		VME-VSIO-1	N/A	

Oracle Corporation
196 Van Buren Street
Herndon, VA 22070

Description: Oracle SILVER Support Service includes 24 X 7 Technical support and software updates. Oracle technical support may be contacted at 1-800-223-1711 and the support contract number is: CSI # 1728687~~1108277~~.

LPS String	S/N	MODEL #	MAINT ENDS	COST/yr[2]
LPS001		CSI 1728687~~1108277~~	11/9~~30~~/99~~8~~	$1168
LPS002		CSI 1728687~~1108277~~	11/9~~30~~/99~~8~~	$1168
LPS003		CSI 1728687~~1108277~~	11/9~~30~~/99~~8~~	$1168

[2] This is an approximate figure as part of the overall Oracle site license.

LPS004		CSI 1728687~~1108277~~	11/~~930~~/99~~8~~	$1168
LPS005		CSI 1728687~~1108277~~	11/~~930~~/99~~8~~	$1168
			Total	$5840

Miscellaneous

The following items are not under maintenance support as support for these devices was not deemed necessary or these devices are still covered under the manufacture's warranty.

Qty	MODEL #	MAINT ENDS	Estimated Annual Cost Per Device
2	NCD HMX-PRO X-Term	N/A	$236
2	HP Laser Printer	N/A	
1	Lancast Network Hub	N/A	
5	Epson LQ-570+ Printer	N/A	
5	Paralan SCSI Cvtr	N/A	$75
5	DLT 4700	N/A	$1550

Acronyms

BIP	build implementation plan
CCB	Configuration Control Board
CCR	configuration change request
CDR	critical design review
CM	configuration management
COTS	commercial off-the-shelf
CSR	consent-to-ship review
DAAC	Distributed Active Archive Center
DCN	document change notice
DLT	Digital Linear Tape
EDC	EROS Data Center
EROS	Earth Resources Observation System
ESDIS	Earth Sciences Data and Information System
ETM+	Enhanced Thematic Mapper Plus
FAR	final acceptance review
FAT	factory acceptance test
FCA	functional configuration audit
FTE	full time equivalent
F&PS	functional and performance specification
GSFC	Goddard Space Flight Center
HPDI	High Speed Parallel Digital Interface
IAS	Image Assessment System
ICAS	Interactive CCR Automation System
ICD	interface control document
IDPS	Image Data Processing Subsystem
LDTS	LPS Data Transfer Subsystem
LGS	Landsat Ground Station
LPGS	Level 1 Product Generation System
LPS	Landsat 7 Processing System
MACS	Management and Control Subsystem
MFPS	Major Frame Processing System
MO&DSD	Mission Operations and Data Systems Directorate
MRT	mission readiness test
NASA	National Aeronautics and Space Administration
O&M	operations and maintenance
ORR	operational readiness review
ORT	operational readiness test

PCA	physical configuration audit
PCD	payload correction data
PCDS	PCD Processing Subsystem
PCMB	Project Configuration Management Board
PTS	Problem Tracking System
RDCS	Raw Data Capture Subsystem
RDPS	Raw Data Processing Subsystem
SAT	site acceptance test
SGI	Silicon Graphics, Inc.
SIT	system integration test
SOP	standard operating procedure
TBD	to be determined
TBR	to be resolved
TBS	to be supplied
USGS	U.S. Geological Survey
VSIO	Very High Speed Serial Interface